

MULTIMEDIA



UNIVERSITY

STUDENT ID NO

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# MULTIMEDIA UNIVERSITY

## FINAL EXAMINATION

TRIMESTER 3, 2016/2017

**PBM0045 – MATHEMATICS**

(Foundation in Management / Foundation in Business)

26 May 2017  
3.00 p.m. – 5.00 p.m.  
(2 Hours)

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### INSTRUCTIONS TO STUDENT

1. This question paper consists of 2 pages with **FIVE** questions.
2. Attempt **ALL** five questions. The distribution of the marks for each question is given.
3. Please write all your answers in the answer booklet provided. All necessary workings **MUST** be shown.

**Question 1**

- a. Factor :  $(m+4)^3 - 9m - 36$ . (4 marks)
- b. Solve :  $\frac{1}{2} - \left(2x - \frac{1}{2}(x-3) + \frac{x}{2}\right) 2 < 0$ . (4 marks)
- c. Solve:  $\sqrt{2y+9} = \sqrt{y+1} + \sqrt{y+4}$ . (8 marks)
- d. Determine the domain of each function:
- i.  $g(x) = \frac{2x+1}{3x^3 - 2x^2 - 12x + 8}$  (4 marks)
- ii.  $f(x) = \frac{\sqrt{15x^2 + 7x - 2}}{4x - 1}$  (5 marks)

(Total = 25 marks)

**Question 2**

- a. The fifth term and the twelfth term of a geometric progression are  $\frac{5}{4}$  and 160 respectively. Find the 28<sup>th</sup> term of the geometric progression. (6 marks)
- b. Given the arithmetic progression: 1, 4, 7, ...,  $x$ , ....
- i. If  $x$  is the  $n$ th term, show that  $x = 3n - 2$ . (3 marks)
- ii. Find the sum of the first  $n$  terms if  $n$  is 25. (3 marks)

(Total = 12 marks)

**Question 3**

Solve the following system of linear equations using the inverse of coefficient matrix.

$$5x - 6y - 7z - 7 = 0$$

$$6x - 4y + 10z + 34 = 0 \quad (13 \text{ marks})$$

$$2x + 4y - 3z - 29 = 0$$

(Total = 13 marks)

**Continued...**

**Question 4**

a. Find  $f'(x)$  for the given functions and simplify the answers.

i.  $f(x) = -\frac{11}{9}x^{\frac{13}{7}} + \frac{12}{25}x^{10} - 100\sqrt[3]{x^2} + \frac{24}{x^{\frac{4}{5}}}$  (4 marks)

ii.  $f(x) = -3x^2(4x^2 + 7)^3$  (6 marks)

iii.  $f(x) = \frac{x^2 + 5x}{(3x^4 + 1)^3}$  (6 marks)

b. Consider the function  $y = 3u^4 - 4u + 5$ , where  $u = x^3 - 2x - 5$ .

i. Use the chain rule to find  $\frac{dy}{dx}$  when  $x = 2$ . (6 marks)

ii. Find the equation for the tangent line to the graph of  $y(x)$  at  $x = 2$ . (3 marks)

(Total = 25 marks)

**Question 5**

Evaluate the following integrals.

a.  $\int 8x^{-\frac{1}{4}} \left( x - \frac{1}{3x^3} \right) - \left( \frac{\sqrt{x} + 1}{\sqrt[5]{x^2}} \right) dx$  (5 marks)

b.  $\int_0^4 9x^{\frac{1}{2}} \sqrt{x^{\frac{3}{2}} + 1} dx$  (7 marks)

c.  $\int \frac{18x^2 - 24x + 6}{(x^3 - 2x^2 + x + 12)^5} dx$  (5 marks)

d. A manufacturer has found that marginal cost,  $\frac{dC}{dq} = 3q^2 - 60q + 400$  Ringgit per unit when  $q$  units have been produced. The total cost,  $C(q)$  of producing the first 2 units is RM900. What is the total cost of producing the first 8 units? (8 marks)

(Total = 25 marks)

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